Canadian Grain Commission
Commission canadienne des grains

Quality of western Canadian solin 2002

Douglas R. DeClercq
Oilseeds Chemist

James. K. Daun
Program Manager
Oilseeds and Pulses

Contact: Doug DeClercq
Tel: 204 983-3354
Email: ddeclercq@grainscanada.gc.ca
Fax: 204 983-0724

Grain Research Laboratory
Canadian Grain Commission
1404–303 Main Street
Winnipeg MB R3C 3G8
www.grainscanada.gc.ca

Canada

Quality of western Canadian solin 2001

Table of contents

Tables

Figures

Quality of western Canadian solin 2002

Introduction

This report presents quality data and information based on the CGC 2002 harvest survey of western Canadian solin. Quality data presented includes oil content, protein content, and fatty acid composition of solin harvest survey samples. Quality data are based on analyses of solin samples forwarded to the CGC Grain Research Laboratory (GRL).

Solin is the name adopted by the Flax Council of Canada to distinguish yellow seeded, low linolenic acid flaxseed from conventional brown flaxseed.

See (http://www.flaxcouncil.ca/38.htm).

Summary

The 2002 Canadian Grain Commission (CGC) harvest survey of western Canadian solin shows significant increases in both the total oil content and the linoleic acid content of the oil. The 2002 oil content, 46.2%, is 1.4% higher while the protein content, 22.7%, is 0.4% higher than in 2001. The linoleic acid content, 72.6%, is significantly higher than the 69.7% in 2001.

Weather and production review

Weather review

The weather and growing conditions for the 2002 solin harvest survey were similar to those for the flaxseed survey. The Weather and Crop Surveillance department of the Canadian Wheat Board provided most of the weather review for this report (http://www.cwb.ca/en/growing/weather/crop_issues.jsp).

Seeding

The extremely dry conditions, combined with cooler than normal weather in April and May, delayed seeding of cereal and oilseed crops. Planting in Western Canada was only 75 % complete by the end of May. Heavy rains fell in the southern areas of Saskatchewan and Alberta during the first week of June, further delaying planting in those regions. Seeding continued into the third week of June in those areas that received heavy rains. Northern and central growing areas of Saskatchewan and Alberta remained dry and crops were planted into dust. Germination was quite uneven in these regions, with some crops not emerging until rains fell in July. Seeding progressed rapidly in eastern Saskatchewan and Manitoba, with planting in these areas finishing during the first week of June.

Growing conditions

Cool weather during May and early June slowed crop growth and development across the Prairies. Heavy rains in the southern Prairies did improve soil moisture conditions, especially in Alberta and Saskatchewan. The heavy rains caused some flooding in all three provinces resulting in some reseeding, especially in southern Alberta. Warmer than normal temperatures during the second half of June increased crop stress, especially in the parched regions of northern Alberta and Saskatchewan. The dry conditions caused uneven emergence in oilseed crops, with many fields having three to four stages of development.

The warmer than normal weather continued through July, which caused severe stress to all crops. Yield potential for most crops declined rapidly under the stressful conditions. The rainfall pattern of the spring continued into July, with the heaviest rainfall reported in the southern Prairies. Northern regions reported minimal amounts during the month, with only isolated areas reporting enough rainfall to improve crop prospects. Even in the regions that had received adequate moisture during the spring, severe heat stress began to take a toll on production prospects.

The warm temperatures did accelerate crop development, especially in eastern areas of the Prairies. A cool, wet weather pattern settled over the Prairies during the first week in August, bringing significantly above normal rainfall to the dry areas in Saskatchewan. A significant frost during the first week of August caused damage to crop quality in northern and central areas of Saskatchewan and Alberta. The rains brought a flush of secondary growth in the drought regions and delayed maturity in southern areas.

Harvest conditions

The harvest started in southern Manitoba and southeastern Saskatchewan in the third week of August. Frequent rains during the last week of August and first two weeks of September resulted in a reduction in grade pattern of the mature crops in the eastern Prairies. Severe frost was reported by the middle of the month in Saskatchewan and Alberta, which brought an end to the growing season in most areas. Harvest during the last half of September continued to be plagued by frequent light to heavy showers. In eastern growing areas, significant harvest progress was made during the last two weeks of September, while western areas continued to struggle with poor drying conditions. The uneven growth of crops in Alberta and Saskatchewan continued to slow harvest activity into October. Frequent rainfall combined with cooler than normal temperatures delayed further progress. Snow during the last two weeks of October has essentially brought an end to harvest activity. As with most crops grown in western Canada, a portion of the 2002 solin crop may not be harvested until the spring of 2003.

Production and grade

Although Statistics Canada does not publish official production statistics for solin, the industry consensus is that solin acres were somewhat higher than in 2001. The grade pattern of all 2002 crops was negatively affected by the cool, wet conditions experienced since August. A major concern for solin has been general weathering of the crop with immature, underdeveloped and discoloured damage being noted. In some areas, as a result of inadequate weed control, solin samples were downgraded due to high levels of admixture.

Harvest survey samples

The 2002 solin harvest survey included 86 samples compared to 46 in 2001. Fifty-four of the samples came from Manitoba while 32 came from Saskatchewan. The CGC's Industry Services Division graded 69 samples as No. 1 Canada Western solin, eight as No. 2 CW, three as No. 3 CW, and six as Sample Grade CW. Sixty-six samples, or about 77% of the total, were identified as variety 1084. In addition, there were 17 samples identified as variety 2047 and three had no variety identification. By comparison, 78% of the 2001 survey samples were identified as variety 1084.

The GRL received the solin samples representing the 2002 crop during the period September to December 2002. For the harvest survey, individual samples are cleaned to remove dockage and graded by CGC Industry Services prior to testing. Solin samples are analyzed for oil content, protein content, linolenic acid, linoleic acid, and iodine value using a NIRSystems 6500 scanning near infrared spectrometer, calibrated to and verified against the appropriate reference method. For this report, composite samples were used for measuring complete fatty acid profiles by gas liquid chromatography. Composite samples were prepared by combining No. 1 CW samples by province and variety.

Quality of 2002 solin

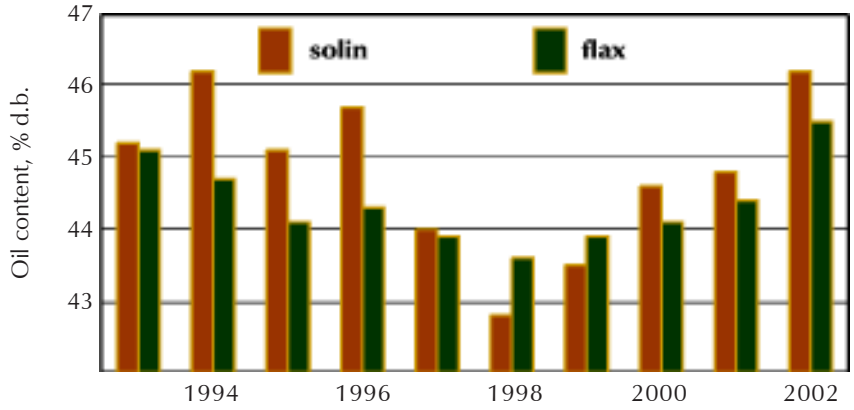
Quality data for No. 1 CW solin 2002 harvest survey samples are shown in Table 1, including oil content, protein content, fatty acid composition and iodine value. Data for No. 1 CW solin are also summarized by province in Table 2 and by variety in Table 3. The quality of solin and conventional flaxseed from 2002 and 2001 is compared to the long-term means in Table 4. Trends in the solin and flaxseed quality data since the start of the solin survey in 1993 are shown in graphical form in Figures 1 to 4. The means and standard deviations of the 2002 NIR survey data can be found at http://www.grainscanada.ca/Quality/qualmenu-e.htm#Solin.

Oil content

The average oil content of No. 1 CW solin 2002 survey samples is 46.2%, an increase of 1.4% compared to 2001. The average oil content of Manitoba samples was 1.0% higher than those from Saskatchewan. The oil content of No. 1 CW solin samples from producers across western Canada varied from 40.1% to 49.5%. Figure 1 shows both solin and conventional flaxseed had significantly higher oil contents for the 2002 surveys.

Despite the stressful growing conditions in parts of the solin growing regions of the prairies, the average oil content in 2002 (46.2%) is much higher than the long-term mean (44.7%). The introduction of variety 1084 in 2000 and 2047 in 2002 is likely a major influence on average oil contents. In 2000, survey samples of the variety 1084 tested 3.1 % higher in oil content than the then popular 989 variety. For 2002, the ten No. 1CW samples of 2047 had an oil content of 48.3%, which is 2.5% higher than the 1084 samples (Table 3). These varietal improvements in oil content likely contributed to the 2002 average oil content being 1.5% above the long-term mean.

Figure 1 • No. 1 Canada Western solin and flaxseed
Oil content of harvest survey samples, 1993–2002



Protein content

The average protein content of No. 1 CW solin from the 2002 survey was 22.7%, an increase of 0.4% from 2001. On average, Saskatchewan solin contained 0.6% more protein than the Manitoba samples. The protein content of No. 1 CW solin samples from producers across western Canada varied from 18.5% to 26.4%. The average protein content of the new variety, 2047, was 0.6% higher than that of the variety 1084 (Table 3). This contributed to an average protein content in 2002 that was well above the ten-year mean of 22.1%. Solin did not show the slight decrease in protein content that conventional flaxseed did in 2002 (Figure 2).

Figure 2 • No. 1 Canada Western solin and flaxseed
Protein content of harvest survey samples, 1993–2002

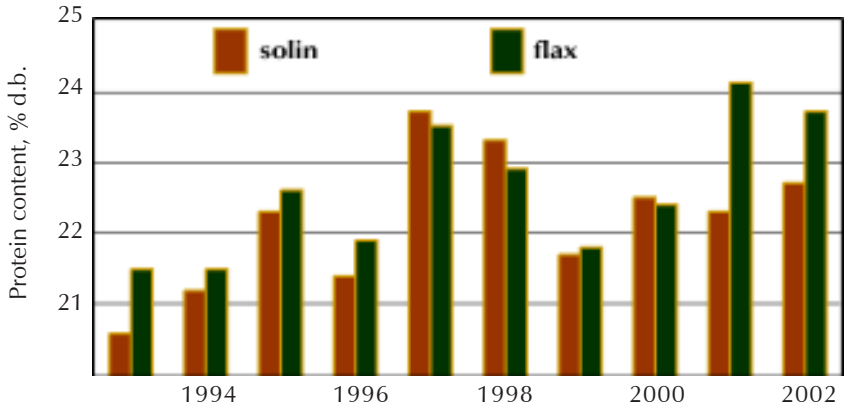
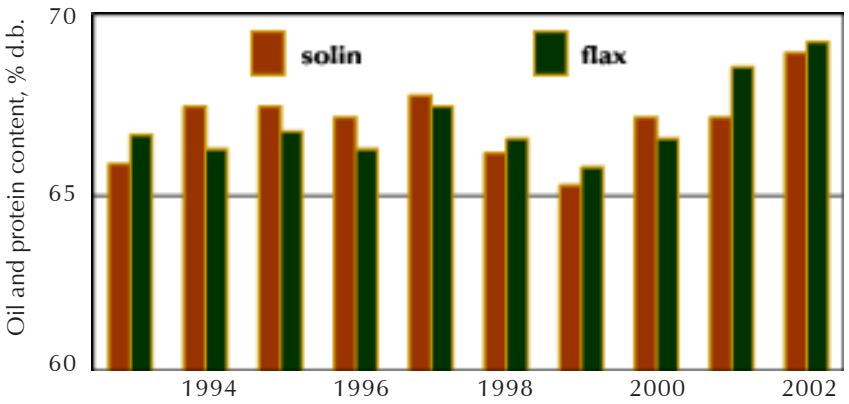


Figure 3 • No. 1 Canada Western solin and flaxseed
Sum of oil and protein contents of harvest survey samples, 1993–2002



Fatty acid composition

The mean linolenic acid (C18:3) content of the 2002 solin samples was 2.1%, slightly higher than the 2.0% in 2001. This is well below the maximum 5% linolenic acid specified for solin. Figure 4 illustrates how the lower levels of linolenic acid in solin oil results in a lower iodine value compared to conventional flaxseed oil.

The mean linoleic acid (C18:2) content of the 2002 solin survey samples increased to 72.6% from 69.7% in 2001. The linoleic acid of No. 1 CW solin samples from producers across western Canada varied from 68.0% to 74.8%. In the 2002 survey, the variety 2047 contained higher amounts of linoleic acid than 1047 (Table 3). This suggests the increase in the average linoleic acid content of the 2002 survey samples was attributable of the introduction of the new variety.

Figure 4 • No. 1 Canada Western solin and flaxseed Iodine value of harvest survey samples, 1993–2002

Table 1 • No. 1 Canada Western solin
Quality data for 2002 harvest survey

Quality parameter	Mean	Std. Dev.	Minimum	Maximum	Range
Oil content[1], %	46.2	1.6	40.1	49.5	9.4
Protein content[2], %	22.7	1.3	18.5	26.4	7.9
Palmitic acid[3], %	5.3	0.5	5.0	6.8	1.8
Stearic acid[3], %	3.5	0.4	2.8	4.3	1.5
Oleic acid[3], %	15.7	1.5	13.4	19.1	5.7
Linoleic acid[3], %	72.6	1.0	67.5	74.8	7.3
Linolenic acid[3], %	2.1	0.1	1.9	2.7	0.8
Iodine value	144	1.2	140	147	7

[1] Dry matter basis
[2] N x 6.25; dry matter basis
[3] Percentage of total fatty acids including: palmitic (C16:0), stearic (C18:0), oleic (C18:1), linoleic (C18:2), and linolenic (C18:3)

Table 2 • No. 1 Canada Western solin
Quality data for 2002 harvest survey by province

Province	Number of samples	Average oil content[1]	Average protein content[2]	Average linolenic content[3]	Average linoleic content[3]	Average iodine value
		%	%	%	%	
Manitoba	41	46.6	22.5	2.2	72.5	145
Saskatchewan	28	45.6	23.1	2.1	72.7	145
Western Canada	**69**	**46.2**	**22.7**	**2.2**	**72.6**	**145**

[1] Dry matter basis
[2] N x 6.25; dry matter basis
[3] Percentage of total fatty acids in oil for linolenic (C18:3) and linoleic (C18:2) acid

Table 3 • No. 1 Canada Western solin
Quality data for 2002 harvest survey by variety

Variety:	1084	2047	All
Number of samples	59	10	69
Oil content[1],%	45.8	48.3	46.2
Protein content[2],%	22.7	23.3	22.7
Palmitic acid[3], %	5.2	5.7	5.3
Stearic acid[3],%	3.6	3.2	3.5
Oleic acid[3],%	15.9	14.8	15.7
Linoleic acid[3],%	72.5	73.5	72.6
Linolenic acid[3],%	2.1	2.1	2.1
Iodine value	145	146	145

[1] Dry matter basis
[2] N x 6.25; dry matter basis
[3] Percentage of total fatty acids including: palmitic (C16:0), stearic (C18:0), oleic (C18:1), linoleic (C18:2), and linolenic (C18:3)

Table 4 • No. 1 Canada Western solin and conventional flaxseed
Quality data for 2002 and 2001 harvest surveys and long-term means

	2002		2001		1993-2001	
Parameter	Solin	Flaxseed	Solin	Flaxseed	Solin	Flaxseed
Oil content[1],%	46.2	45.5	44.8	44.4	44.7	44.2
Protein content[2],%	22.7	23.7	22.3	24.1	22.1	22.5
Palmitic acid[3], %	5.3	4.9	5.5	5.2	6.1	5.3
Stearic acid[3],%	3.5	3.1	4.2	3.7	3.8	3.3
Oleic acid[3],%	15.7	17.3	17.5	19.5	15.5	17.9
Linoleic acid[3],%	72.6	15.1	69.7	15.1	71.3	14.7
Linolenic acid[3],%	2.1	58.9	2	56.3	2	58.4
Iodine value	145	195	141	190	143	193

[1] Dry matter basis
[2] N x 6.25;dry matter basis
[3] Percentage of total fatty acids including: palmitic (C16:0), stearic (C18:0), oleic (C18:1), linoleic (C18:2), and linolenic (C18:3)